

## **REMARKS**

Applicant thanks the Examiner for the thorough examination of the application. The Office Action mailed March 24, 2006, however, continued to reject all claims 9-10 and 12-19. For at least the reasons set forth hereinbelow, Applicant respectfully disagrees and requests reconsideration and withdrawal of the rejections.

Claims 9-10 and 12-19 have been rejected under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the written description requirement. In addition, claims 9-10 and 12-19 have been rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Fujikawa et al (U.S. 6,297,519) in view of Lee et al. (U.S. 6,737,305).

### **Rejections Under 35 U.S.C. 112**

Claims 9-10 and 12-19 have been rejected under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the written description requirement. As set forth above, Applicant has amended the specification relative to the informalities and/or alleged deficiencies noted in the Office Action. Accordingly, Applicant submits that, as amended, this application and all claims are in proper compliance with 35 U.S.C. § 112, first paragraph.

### **Rejections Under 35 U.S.C. 103(a)**

Claims 9-10 and 12-19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Fujikawa et al (U.S. 6,297,519) in view of Lee et al. (U.S. 6,737,305). Applicant respectfully submits that claim 9 is patentable for at least the reasons discussed below.

Independent claim 9 recites:

9. An interconnect structure, comprising:
  - a substrate having a surface;
  - a dielectric layer disposed on the surface of the substrate;
  - a first metal layer disposed in the dielectric layer, having a first and second end, wherein the direction extending from the first end to the second end is parallel to the substrate surface;
  - a second metal layer disposed on the dielectric layer, wherein the second metal layer is isolated from the first metal layer by the dielectric layer; and
  - a plurality of **conductive plugs** parallel to extending direction of the first metal layer disposed in the dielectric layer and on the first end of the first metal layer to electrically connect the second metal layer,
- wherein the first metal layer and the second metal layer are a gate metal layer and a source/drain metal layer of a TFT array respectively.

*(Emphasis Added)*

It is clear that the interconnect structure in claim 9 comprises a plurality of conductive plugs parallel to the extending direction of the first metal layer disposed in the dielectric layer

In page 3 of the Office Action, the Examiner asserts that “a plurality of conductive plugs (portions 35b in the contact holes) parallel to extending direction of the first metal layer disposed in the dielectric layer 4...”. Applicant respectfully disagrees.

This rejection pre-supposes that the portions 35b in the contact holes in Fujikawa equate to the conductive plugs of claim 9. In fact, they do not. Referring to Col. 7, line 64 to Col. 8 line 7 of US 6,297,519, Fujikawa teaches:

The **terminal protective conductive film 35b** is formed on the protective insulating film 30, covering the inspection gate terminal 22. **The terminal protective conductive film 35b is connected via the contact hole 25b** to the inspection gate terminal 22. Similar to the inspection drain terminal 21 shown in FIG 4A, the gate insulating film 4 and protective insulating film 30 are left in the inner area of the contact hole when the inspection gate terminal 22 is viewed along a direction normal to the substrate surface. It is therefore possible to prevent the underlying inspection gate terminal 22 from being damaged by the probe.

As well, Fujikawa teaches terminal protective conductive film 35b formed on a protective insulating film 30 and extending to the contact hole 25b.

As the term “plug” was not specifically defined, in the specification of the present application, it gets its proper construction from common dictionaries. As define in [www.answer.com](http://www.answer.com), a “plug” is defined as follows:

1. *Electricity.*
  - a. A fitting, commonly with two **metal prongs** for insertion in a fixed socket, used to connect an appliance to a power supply.
  - b. A spark plug.

Thus, according to the common dictionary definition, a plug is a **metal prong** for insertion in a fixed socket. The portion of the terminal protective conductive film 35b extending to the contact hole 25b, however, is the conductive film themselves, and therefore it is NOT a prong or plug. Accordingly, Applicant disagrees that the portions 35b in the contact holes of Fujikawa can be properly related to the claimed conductive plugs of claim 9. For at least this reason, Application submits that the rejection should be withdrawn.

Further, MPEP 2142 provides that:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In connection with the third criteria, MPEP 2143.03 goes on the state:

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Applicant therefore submits that Fujikawa fails to teach or suggest all of the limitations recited in claim 9.

Indeed, the terminal protective conductive film extending to the contact hole in Fujikawa cannot be properly related to the plug of claim 9.

For at least these reasons, claim 9 is allowable over the cited reference. Reconsideration of this rejection is hereby respectfully requested.

With regard to claim 14, claim 14 recites:

14. An interconnect structure, comprising:
  - a substrate having a surface;
  - a dielectric layer disposed on the surface of the substrate;
  - a first metal layer disposed in the dielectric layer, having a first and second end, wherein the direction extending from the first end to the second end is parallel to the substrate surface;
  - a second metal layer disposed on the dielectric layer; and

*a plurality of plugs parallel to extending direction of the first metal layer disposed on the first end of the first metal layer*, wherein the plug farther from the first end of the metal layer is conductive and electrically connects the second metal layer.

*(Emphasis Added)*

It is clear that the interconnect structure in claim 14 comprises plurality of plugs parallel to extending direction of the first metal layer disposed on the first end of the first metal layer.

For the same reasons described above in connection with claim 9, Fujikawa also fails to teach or suggest all of the limitations recited in claim 14. Accordingly, claim 14 is allowable over the cited reference. Reconsideration of this rejection is hereby respectfully requested.

With regard to claim 18, claim 18 recites:

18. An interconnect structure, comprising:
  - a substrate;
  - a dielectric layer disposed the substrate;

a first metal line disposed in the dielectric layer, having a first and second end, wherein the direction extending from the first end to the second end is parallel to the substrate surface;

*a first plug and a second plug* disposed on the first end of the first metal line, wherein the first plug is closer to the first end than the second plug;

a second metal line disposed on the dielectric layer, connecting the first metal line through the second plug.

*(Emphasis Added)*

As clearly defined in claim 18, the interconnect structure comprises a first plug and a second plug disposed on the first end of the first metal line. For the same reasons described above (with relation to the proper interpretation of the claimed term “plug”), Fujikawa also fails to teach or suggest all of the limitations recited in claim 18. Accordingly, claim 18 is allowable over the cited reference. Reconsideration of this rejection is hereby respectfully requested.

With regard to claim 19, claim 19 recites:

19. The interconnect structure as claimed in claim 18, wherein *the second metal line does not connect to the first plug.*

*(Emphasis Added)*

As is clearly defined in claim 19, the interconnect structure of claim 19 comprises the second metal line not connecting to the first plug. Fujikawa, however, does not teach the second metal line does not connect to the first plug. Indeed, as shown in FIG. 4B, Fujikawa teaches the terminal protective conductive film 35b connected via **both the contact holes 25b** to the inspection gate terminal 22. As well, Fujikawa teaches the second metal connects to the first plug.

MPEP 2142 reads in part:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the

reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In connection with the third criteria, MPEP 2143.03 goes on the state:

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Applicant therefore submits that Fujikawa fails to teach or suggest all of the limitations recited in claim 19. For at least this reason, claim 19 is allowable over the cited reference. Reconsideration of this rejection is hereby respectfully requested.

Hence it is believed that the previously amended claims 9 and 14 are allowable over the cited references. Insofar as claims 10-13 depend from claim 9 and claims 15-17 depend from claim 14, these claims are also allowable at least by virtue of their dependency.

### **Conclusion**

The Applicant believes that the application is now in condition for allowance and respectfully requests so.

All pending claims 9-10 and 12-19 are believed to be in condition for allowance, and the Examiner is respectfully requested to pass those claims to issuance. If the Examiner believes a teleconference will expedite the examination of this application, the Examiner is invited to contact the undersigned attorney at 770-933-9500.

No fee is believed to be due in connection with this Amendment and Response to Office Action. If, however, any fee is deemed to be payable, you are hereby authorized to charge any such fee to deposit account 20-0778.

Respectfully submitted ,

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